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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/919,998	08/02/2001	Tsunenobu Hori	P 0282798 U3-0140-TM	7177
23117	7590	03/01/2004	EXAMINER	
NIXON & VANDERHYE, PC 1100 N GLEBE ROAD 8TH FLOOR ARLINGTON, VA 22201-4714			KEANEY, ELIZABETH MARIE	
			ART UNIT	PAPER NUMBER
			2882	

DATE MAILED: 03/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/919,998

Applicant(s)

HORI, TSUNENOBU

Examiner

Elizabeth Keaney

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 06 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-3 is/are allowed.
- 6) ☒ Claim(s) 4,6 and 10-14 is/are rejected.
- 7) ☒ Claim(s) 5 and 8 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

Receipt is acknowledged of the Remarks and Amendments filed 6 November 2003.

#### ***Response to Arguments***

Applicant's arguments, see page 8, lines 19-23, filed 6 November 2003, with respect to the rejection(s) of claim(s) 4, 7 and 10 under 35 U.S.C. 102(b) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn.

However, upon further consideration, a new ground(s) of rejection is made in view of Gotou et al. (US Patent 6,078,129; hereinafter Gotou). The examiner further notes that arguments regarding claim 9 were omitted from the response filed 6 November 2003. Therefore, the rejection claim 9 in view of Katoh et al. (US Patent 5,465,022; hereinafter Katoh) is maintained as well as introducing a rejection of claim 9 in view of Gotou.

#### ***Drawings***

The drawings were received on 6 November 2003. These drawings are approved.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 9 is rejected under 35 U.S.C. 102(b) as being anticipated by Katoh.

Katoh discloses, in figure 6 and throughout the disclosure, a spark plug comprising:

- a tubular housing (25);
- a central bar electrode (4) supported by the tubular housing with electrical insulation therebetween (20);
- a ground electrode (3) extending from one end of the tubular housing (25), at least one of the central bar electrode (4) and the ground electrode (3) servicing as a base material;
- a weld portion (15; diffusion layer) on the base material (4); and
- a chip (11) on the weld portion (15), including a novel metal (column 7, line 41) for spark discharge through the central bar electrode (4) and the ground electrode (3), wherein a linear expansion coefficient of the weld portion is between those of the base material and the chip (column 7, line 41).

Claims 4,6,7,9,10-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Gotou.

Re claim 4: Gotou discloses, in figures 2 and 12 and throughout the disclosure, a spark plug comprising:

- a tubular housing (91);

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- a central bar electrode (2) supported by the tubular housing (91) in the tubular housing (91) with electrical insulation (92) therebetween;
- a ground electrode (3) extending from one end of the tubular housing (91);
- a stress releasing layer (15), arranged on a side of the one end of the tubular housing (91) on an end surface of a base material (columns 4-5, lines 67-1) which is at least one of the central bar electrode (2) and the ground electrode (3);
- a chip (10), being arranged on the stress releasing layer (15) and including a novel metal (column 4, line 67), for spark discharge through the central bar electrode (2) and the ground electrode (3); and
- a weld portion (11) formed between the base material (2) and the chip (10) with materials of the base material, the stress releasing layer, and the chip (column 2, lines 16-17) by laser welding (column 5, line 22) to fix the chip (10) to the base material (2), wherein a linear expansion coefficient of the stress releasing layer is between those of the base material and the chip (column 5, line 30).

Re claim 6: Gotou discloses the chip (10) includes Ir of more than 50% by weight (column 4, lines 53-54).

Re claim 7: Gotou discloses, in figures 2 and 12 and throughout the disclosure, a method of producing a spark plug including a tubular housing (91), a central bar

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electrode (2) supported by the tubular housing (91) in the tubular housing (91) with electrical insulation (92) therebetween, and a ground electrode (3) extending from one end of the tubular housing (91), comprising the steps of:

- providing a stress releasing layer (15) on a side of the one end of the tubular housing (91) on an end surface of the base material which is at least one of the central bar electrode (2) and the ground electrode (3);
- providing a chip (10) including a novel metal for spark discharge on the stress releasing layer (15) and having a linear expansion coefficient between those of the base material and the chip; and
- fixing the chip (10) to the base material by forming a weld layer (11) at an interface portion of the base material (2), the stress releasing layer (15) and the chip (10).

Re claim 9: Gotou discloses, in figures 2 and 12 and throughout the disclosure, a spark plug comprising:

- a tubular housing (91);
- a central bar electrode (2) supported by the tubular housing (91) in the tubular housing (91) with electrical insulation (92) therebetween;
- a ground electrode (3) extending from one end of the tubular housing (91), at least one of the central bar electrode and the ground electrode servicing as a base material;
- a weld portion (11) on the base material (2); and

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- a chip (10) on the weld portion (11), including a novel metal (column 4, line 67) for spark discharge through the central bar electrode (2) and the ground electrode (3), wherein a linear expansion coefficient of the weld portion is between those of the base material (2) and the chip (10).

Re claim 10: Gotou discloses, in figure 12 and throughout the disclosure, the weld portion (11) is arranged around the stress releasing layer (15).

Re claims 11 and 13: Gotou discloses, in figures 2 and 12 and throughout the disclosure, a spark plug comprising:

- a tubular housing (91);
- a central bar electrode (2) supported by the tubular housing (91) in the tubular housing (91) with electrical insulation (92) therebetween;
- a ground electrode (3) extending from one end of the tubular housing (91);
- a stress releasing layer (15), arranged on a side of the one end of the tubular housing (91) on an end surface of a base material (columns 4-5, lines 67-1) which is at least one of the central bar electrode (2) and the ground electrode (3);
- a chip (10), being arranged on the stress releasing layer (15) and including a novel metal (column 4, line 67), for spark discharge through the central bar electrode (2) and the ground electrode (3); and

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- a weld portion (11) having a ring shape surrounding the stress releasing layer (15) between the base material (2) and the chip (10) and including materials of the base material, the stress releasing layer, and the chip (column 2, lines 15-17) for fixing the chip (10) to the base material (2), wherein a linear expansion coefficient of the stress releasing layer is between those of the base material and the chip.

Re claims 12 and 14: Gotou discloses, in figures 2 and 12 and throughout the disclosure, a spark plug comprising:

- a tubular housing (91);
- a central bar electrode (2) supported by the tubular housing (91) in the tubular housing (91) with electrical insulation (92) therebetween;
- a ground electrode (3) extending from one end of the tubular housing (91);
- a stress releasing layer (15), arranged on a side of the one end of the tubular housing (91) on an end surface of a base material (columns 4-5, lines 67-1) which is at least one of the central bar electrode (2) and the ground electrode (3);
- a chip (10), being arranged on the stress releasing layer (15) and including a novel metal (column 4, line 67), for spark discharge through the central bar electrode (2) and the ground electrode (3); and
- a weld layer (11) between the base material (2) and the chip (10), including materials of the base material, the stress releasing layer, and the



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chip (column 2, lines 15-17), for fixing the chip to the base material (2) wherein a linear expansion coefficient of the stress releasing layer is between those of the base material and the chip, and wherein the weld layer (11) has an outer interface surface connecting an outer surface of the chip and an outer surface of the base material and inwardly protrudes from the outer interface surface to the stress releasing layer (see figure 12).

***Allowable Subject Matter***

Claims 1-3 are allowable over the prior art.

Claims 5 and 8 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Re claims 1-3: reasons are set forth in prior office action dated 9 July 2003.

Re claim 5: The best prior art of record discloses a spark plug comprising a central electrode, a stress releasing layer and a chip, wherein the central electrode, stress releasing layer and chip are welded together at a welding portion containing material of the central electrode, the stress releasing layer and the chip. However, the best prior art of record fails to teach or fairly suggest a ratio of a maximum sectional area of the weld portion along the end surface to a sectional area of the chip along the

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end surface being greater than or equal to  $(1.4 - t)/2$ ; wherein  $t$  is the thickness of the stress releasing layer, as claimed in claim 5.

Re claim 8: The best prior art of record discloses a spark plug comprising a central electrode, a stress releasing layer and a chip, wherein the central electrode, stress releasing layer and chip are welded together at a welding portion containing material of the central electrode, the stress releasing layer and the chip. However, the best prior art of record fails to teach or fairly suggest the weld portion including two ring shape layers, wherein the first ring is between the base material and the stress releasing layer and the second ring is between the stress releasing layer and the chip, as claimed in claim 5.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Keaney whose telephone number is (571)272-2489. The examiner can normally be reached on Monday-Thursday 5:30-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on (571)272-2490. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
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DAVID V. BRUCE  
PRIMARY EXAMINER